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- Derwent Patents Citation Index (File 342)
- Derwent World Patents Index (for users in Japan) (File 352)
- Derwent World Patents Index First View (File 331)
- Derwent World Patents Index (File 351)
- Derwent World Patents Index (File 350)
- Ei EnCompassPat (File 353)
- European Patents Fulltext (File 348)
- French Patents (File 371)
- German Patents Fulltext (File 324)
- IMS Patent Focus (File 447, 947)
- INPADOC/Family and Legal Status (File 345)
- JAPIO - Patent Abstracts of Japan (File 347)
- LitAlert (File 670)
- U.S. Patents Fulltext (1971-1975) (File 652)
- U.S. Patents Fulltext (1976-present) (File 654)
- WIPO/PCT Patents Fulltext (File 349)
- TRADEMARKSCAN - U.S. Federal (File 226)

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New features available in the latest release of DialogLink 5 (August 2006)

- Ability to resize images for easier incorporation into DialogLink Reports
- New settings allow users to be prompted to save Dialog search sessions in the format of their choice (Microsoft Word, RTF, PDF, HTML, or TEXT)
- Ability to set up Dialog Alerts by Chemical Structures and the addition of Index Chemicus as a structure searchable database
- Support for connections to STN Germany and STN Japan services

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? Help Log On Msg
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                    ***
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the link.

***The 2008 EMTREE Thesaurus has been added to EMBASE
(Files 72, 73,
772, and 972)***

RESUMED UPDATING
```

```
***File 120, U.S. Copyrights
                    ***
RELOADS COMPLETED
***File 50, CAB Abstracts
***File 162, Global Health
***File 342, Patents Citation Index
***File 227, TRADEMARKSCAN(R) - Community Trademarks
                    ***
FILES RENAMED
***File 321, PLASPEC now known as Plastic Properties
Database
                    ***
FILES REMOVED
***Files 476/Financial Times & 473/Financial Times
Abstracts
***Files 359,959,804,  Chemical Economics Handbook
***Files 360,960, Specialty Chemicals Update Program
                    ***
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 >>>and events, please visit What's New from Dialog
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 >>>http://www.dialog.com/whatsnew/.  You can find
news about   <<<
 >>>a specific database by entering HELP NEWS <file
number>.    <<<

? Help Off Line
* * *
Connecting to sahmed - Dialog - 291839
Connected to Dialog via SMS003202582

?   s au=(TAKAJITSUKO RYO or TAKAJITSUKO, RYO or
TAKAJITSUKO R? or TAKAJITSUKO, R?)
>>>W:  One or more prefixes are unsupported
  or undefined in one or more files.
            4   AU=TAKAJITSUKO RYO
            0   AU=TAKAJITSUKO, RYO
            4   AU=TAKAJITSUKO R?
            0   AU=TAKAJITSUKO, R?
S1          4   S AU=(TAKAJITSUKO RYO OR TAKAJITSUKO,
RYO OR TAKAJITSUKO R? OR TAKAJITSUKO, R?)
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K? or OKABE, K?)
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  or undefined in one or more files.
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            0   AU=OKABE, KENICHI
          470   AU=OKABE K?
           23   AU=OKABE, K?
S2         493   AU=(OKABE KENICHI  OR OKABE, KENICHI
OR OKABE K? OR OKABE, K?)

?  s au=(URIU SHIRO  or URIU, SHIRO  or URIU S? or
URIU, S?)
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  or undefined in one or more files.
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            0   AU=URIU, SHIRO
           47   AU=URIU S?
            0   AU=URIU, S?
S3         47   AU=(URIU SHIRO  OR URIU, SHIRO  OR
URIU S? OR URIU, S?)

?  s au=(KAWASAKI HIROYA  or KAWASAKI, HIROYA  or
KAWASAKI H? or KAWASAKI, H?)
>>>W:  One or more prefixes are unsupported
  or undefined in one or more files.
            7   AU=KAWASAKI HIROYA
            0   AU=KAWASAKI, HIROYA
          748   AU=KAWASAKI H?
          141   AU=KAWASAKI, H?
S4        889   AU=(KAWASAKI HIROYA  OR KAWASAKI,
HIROYA  OR KAWASAKI H? OR KAWASAKI, H?)

?
?  S s1 or s2 or s3 or s4
            4   S1
          493   S2
           47   S3
          889   S4
S5       1422   S S1 OR S2 OR S3 OR S4
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?  s s5 not py>2001
Processing
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Processing
Processing
Processing
         1422   S5
     82128698   PY>2001
S6        707   S S5 NOT PY>2001

?  s s6 and ((back(2w)flow) or (back(2w)preassure) or
(flow(w)control))
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
           707   S6
      19460117   BACK
       5770442   FLOW
         22504   BACK(2W)FLOW
      19460117   BACK
            87   PREASSURE
             0   BACK(2W)PREASSURE
       5770442   FLOW
      14911140   CONTROL
        117234   FLOW(W)CONTROL
S7           5   S S6 AND ((BACK(2W)FLOW) OR
(BACK(2W)PREASSURE) OR (FLOW(W)CONTROL))

?  TYPE S7/3,K/ALL
```

7/3,K/1 (Item 1 from file: 340) Links
Fulltext available through: Order File History



```
2952986   3820455
```

M/TWO-STROKE INTERNAL COMBUSTION ENGINE
Inventors:Kawasaki Hiroji (JP); Koga Hiroaki (JP); Tajima Katsuya (JP)
Assignee: Kioritz Corp JP
Assignee Code: 46061
Attorney, Agent or Firm: Brumbaugh, Graves, Donohue & Raymond

| Publication Number | Kind | Publication Date | Application Number | Application Date |
|---|---|---|---|---|
| US 5727506 | A | 19980317 | US 96755032 | 19961122 |

(Cited in 005 later patents)
Priority Applic: JP 95313371 19951130
Calculated Expiration: 20161122

Document Type:
Inventors:Kawasaki Hiroji...

Abstract: ...a crank chamber which has an intake port opening into the
crank chamber, and a flow control feature at the circumferential inner surface of the crank chamber in the vicinity of the
...

Exemplary Claim:

...via a lead valve; a crank shaft rotatably disposed in the crank
chamber; and a flow control feature for retarding flow of non-atomized fuel, disposed at a circumferential inner surface of...

Non-exemplary Claims:

2. The engine according to claim 1, wherein the flow control feature comprises at least one of a weir, a groove, and a recess...

7/3,K/2 (Item 2 from file: 340) Links
Fulltext available through: Order File History
CLAIMS(R)/US Patent


2704828 3620866
E/BROADBAND ISDN REMOTE MULTIPLEXER
Inventors:Fukuda Naoki (JP); Kakuma Satoshi (JP); Uriu
Shiro (JP); Yoshimura Shuji (JP)
Assignee: Fujitsu Ltd JP
Assignee Code: 32608

| Publication Number | Kind | Publication Date | Application Number | Application Date |
|---|---|---|---|---|
| US 5504742 | A | 19960402 | US 93139589 | 19931020 |

(Cited in 088 later patents)
Priority Applic: JP 92281331 19921020
Calculated Expiration: 20131020

Document Type:
...Inventors:Uriu Shiro

Exemplary Claim:

...between a User Network Interface (UNI) format signal having a
destination number in a Generic Flow Control (GFC) field
thereof, which is transmitted on a transmission line
connecting between
said ATM exchange...

Non-exemplary Claims:

...broadband ISDN remote multiplexer, said TAG field containing
the
destination number appended to the Generic Flow Control
(GFC) field of said transmitted signal of User Network
Interface (UNI)
format...

...wherein four bits in said TAG field represent the destination
number
appended to said Generic Flow Control (GFC) field...

...directs a connection with said ATM exchange, and the

destination number
appended to the Generic Flow Control (GFC) field of said
transmitted signal of User Network Interface (UNI) format
transmitted
over said...

...for said ATM exchange, said TAG field containing the
destination number
appended to the Generic Flow Control (GFC) field of said
transmitted signal of User Network Interface (UNI) format...

...wherein four bits in said TAG field represents the destination
number
appended to said Generic Flow Control (GFC) field...14,
wherein said first path-control means converts the destination
number
appended to the Generic Flow Control (GFC) field of said
transmitted signal of User Network Interface (UNI) format and
appends
the...

...ISDN remote multiplexer according to claim 15, wherein the
destination
number appended to said Generic Flow Control (GFC) field
is converted to four bits in said TAG field...

...an ATM switch by carrying out conversion between the
destination number
appended to the Generic Flow Control (GFC) field of said
transmitted signal of User Network Interface (UNI) format and
said
second...

...18, wherein said second path-control means converts the
destination
number appended to the Generic Flow Control (GFC) field of
said transmitted signal of User Network Interface (UNI) format
and
appends the...

...ISDN remote multiplexer according to claim 19, wherein the
destination
number appended to said Generic Flow Control (GFC) field
is converted to four bits in said TAG field...

7/3,K/3 (Item 3 from file: 340) Links
Fulltext available through: Order File History
CLAIMS(R)/US Patent


2306035 3266712
M/CONTROL DEVICE FOR A VALVE
Inventors:Kawasaki Haruhiko (JP); Maehata Kazuhide (JP);
Naitoh Hisato (JP)
Assignee: Kayaba Industry Co Ltd JP
Assignee Code: 45108
Attorney, Agent or Firm: Jordan & Hamburg

| Publication Number | Kind | Date | Application Number | Date |
|---|---|---|---|---|
| US 5161777 | A | 19921110 | US 91776504 | 19911011 |

(Cited in 004 later patents)
Priority Applic: JP 90275626 19901015
Calculated Expiration: 20111011

Document Type:
Inventors:Kawasaki Haruhiko...

Abstract: ...be secured by decreasing error in the valve position detection
to increase the accuracy of flow control and stopping the
control function when the valve is in an abnormal condition, so
as...

7/3,K/4 (Item 1 from file: 324) Links
Fulltext available through: Order File History
GERMAN PATENTS FULLTEXT


0003333673
Zweitakt-Brennkraftmaschine
Chain saw with air-cooled two=stroke internal combustion engine
Patent Applicant/Assignee:
KIORITZ CORP, JP
Inventor(s):
KAWASAKI HIROJI, JP

Publication & Filing Information

| | Serial Number | Kind | Date |
|---|---|---|---|
| Publication | DE 19649165 | A1 | 19970605 |
| Application | DE 19649165 | | 19961127 |

Priority application(s): JP 95313371 19951130 (Original format: JP 31337195 )
Publication Language: German ; Application Language: German
Fulltext Word Count (English): 2051
Fulltext Word Count (German) : 1730
Fulltext Word Count (Both) : 3781 Inventor(s): KAWASAKI HIROJI... Fulltext Availability: Description (English machine translation)Description (English machine translation)...over the full width of the crank chamber. In this preferential zweitakt-internal-combustion engineholds back t hat flow tax proceeds, which is intended at the interior extent surf ace of the crank chamber in... ...which forms a crank chamber, which into the crank chamber opening inlet- passage exhibits, and flow control equipment at the interior extent surface ofthe crank chamber in the proximity of the inlet... Description (German)

7/3K/5 (Item 1 from file: 348) Links
Fulltext available through: Order File History
EUROPEAN PATENTS

00767922
# Absorbent sheet and process for producing the same
# Absorbierende Schicht und Verfahren zu seiner Herstellung
# Feuille absorbante et procede de fabrication

Patent Assignee:

- KAO CORPORATION; (218907)
  14-10, Nihonbashi, Kayabacho 1-chome; Chuo-ku, Tokyo; (JP)
  (Proprietor designated states: all)

Inventor:

- Masaki, Kazumichi
  233-30, Edagawa, Ino-cho; Agawa-gun, Kochi-ken; (JP)
- Kubota, Yoshihito
  949, Ietoshi; Tosa-shi, Kochi-ken; (JP)
- Ichikawa, Eichi
  2282-12, Kanda; Kochi-shi, Kochi-ken; (JP)
- Kaganoi, Mari
  2264-2, Asakura; Kochi-shi, Kochi-ken; (JP)
- Nakanishi, Minoru, c/o Kao Corporation
  Research Laboratories, 2606, Akabane; Ichikai-machi, Hasa-gun, Tochigi-ken; (JP)
- Hamajima, Mitsugu, c/o Kao Corporation
  Research Laboratories, 2606, Akabane; Ichikai-machi, Hasa-gun, Tochigi-ken; (JP)
- Yamamoto, Yasuhiro, c/o Kao Corporation
  Research Laboratories, 2606, Akabane; Ichikai-machi, Hasa-gun, Tochigi-ken; (JP)
- Kawasaki, Hironori, c/o Kao Corporation
  Research Laboratories, 2606, Akabane; Ichikai-machi, Hasa-gun, Tochigi-ken; (JP)
- Kusagawa, Tesuya, c/o Kao Corporation
  Research Laboratories, 2606, Akabane; Ichikai-machi, Hasa-gun, Tochigi-ken; (JP)
- ...JP)
  ; ;
- Kawasaki, Hironori, c/o Kao Corporation...
  ; ;

Legal Representative:

- VOSSIUS & PARTNER (100311)
  Postfach 86 07 67; 81634 Munchen; (DE)

| | Country | Number | Kind | Date | |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Patent | EP | 719531 | A1 | 19960703 | (Basic) |
| | EP | 719531 | B1 | 20010509 | |
| Application | EP | 95120675 | | 19951228 | |
| Priorities | JP | 94328802 | | 19941228 | |
| | JP | 94328854 | | 19941228 | |

Designated States:
DE; ES; FR; GB; IT;

International Patent Class (V7): A61F-013/15Abstract Word Count: 132
NOTE: 1
NOTE: Figure number on first page: 1

| Type | Pub. Date | Kind | Text |
|---|---|---|---|

Publication: English
Procedural: English
Application: English

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS A | (English) | EPAB96 | 1070 |
| SPEC A | (English) | EPAB96 | 30562 |
| CLAIMS B | (English) | 200119 | 1058 |
| CLAIMS B | (German) | 200119 | 972 |
| CLAIMS B | (French) | 200119 | 1148 |
| SPEC B | (English) | 200119 | 30569 |
| Total Word Count (Document A) 31637 | | | |
| Total Word Count (Document B) 33747 | | | |
| Total Word Count (All Documents) 65384 | | | |

Specification: ...articles of the present invention have a high rate of liquid absorption, hardly cause a back-flow of absorbed liquid, and have a decreased incidence of leaks. Where an absorbent member of ... ...of a rate of absorption.

Fig. 19 is a schematic view illustrating measurement of a back-flow.

Fig. 20 is a schematic cross section of a conventional sanitary napkin.

Fig. 21 is...minute later, the same absorption test was repeated to measure the time for re-absorption.

Back-flow:

As shown in Fig. 19, after 10 minutes from the above-described measurement of the...and the weight of physiological saline absorbed in filter paper 224 was taken as a back-flow. (see image in original document) (see image in original document)

EXAMPLE 17

Preparation of Absorbent... ...in terms of fall-off of the polymer, thickness of the article, absorbing time, and back-flow and leakage in a moving mode according to the following test methods. The results obtained... single sanitary napkin.

Measurement of Absorbing Time (5 g), Re-absorbing Time (10 g), and Back-flow in Moving Mode:

A device for measuring the rate of absorption as shown in Fig... ...the weight of defibrinated equine blood absorbed into the absorbent paper was measured as a back-flow (g). The test was conducted 5 times for each sample to obtain an average value for each of absorbing time, reabsorbing time, and back-flow in a moving mode.

Leak Test (Number of Leaks):

As shown in Fig. 23, the... ...articles of the present invention exhibit excellent absorption characteristics in terms of rate of absorption, back- flow, and the like.

Further, in spite of a very simple structure, the absorbent articles of... ...present invention exhibit extremely high performance, having a high rate of absorption and a small back-flow, and being prevented from leaking. This is because the absorbent sheet used therein has a...

Specification: ...articles of the present invention have a high rate of liquid absorption, hardly cause a back-flow of absorbed liquid, and have a decreased incidence of leaks. Where an absorbent member of...of a rate of absorption.

Fig. 19 is a schematic view illustrating measurement of a back-flow.

Fig. 20 is a schematic cross section of a conventional sanitary napkin.

Fig. 21 is...minute later, the same absorption test was repeated to measure the time for re-absorption.

Back-flow:

As shown in Fig. 19, after 10 minutes from the above-described measurement of the... ...and the weight of physiological saline absorbed in filter paper 224 was taken as a back-flow.

EXAMPLE 17

...in terms of fall-off of the polymer, thickness of the article, absorbing time, and back-flow and leakage in a moving mode according to the following test methods. The results obtained...single sanitary napkin.

Measurement of Absorbing Time (5 g), Re-absorbing Time (10 g), and Back-flow in Moving Mode:

A device for measuring the rate of absorption as shown in Fig... ...the weight of defibrinated equine blood absorbed into the absorbent paper was measured as a back-flow (g). The test was conducted 5 times for each sample to obtain an average value for each of absorbing time, re-absorbing time, and back-flow in a moving mode.

Leak Test (Number of Leaks):

As shown in Fig. 23, the ... ...articles of the present invention exhibit excellent absorption characteristics in terms of rate of absorption, back-flow , and the like.

Further, in spite of a very simple structure, the absorbent articles of... ...present invention exhibit extremely high performance, having a high rate of absorption and a small back-flow, and being prevented from leaking. This is because the absorbent sheet used therein has a...

```
?  S Fujitsu and buffer? AND ((BACK(2W)FLOW) OR
(BACK(2W)PREASSURE) OR (FLOW(W)CONTROL))
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
       304245   FUJITSU
       972134   BUFFER?
     19460117   BACK
      5770442   FLOW
        22504   BACK(2W)FLOW
     19460117   BACK
           87   PREASSURE
            0   BACK(2W)PREASSURE
      5770442   FLOW
     14911140   CONTROL
       117234   FLOW(W)CONTROL
S8        174   S FUJITSU AND BUFFER? AND
((BACK(2W)FLOW) OR (BACK(2W)PREASSURE) OR
(FLOW(W)CONTROL))

?  s s8 not py>2001
Processing
Processing
Processing
Processing
          174   S8
     82128698   PY>2001
S9        100   S S8 NOT PY>2001

?  s s9 and ((first or second or third or
fourth)(2w)buffer)
Processing
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Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
Processing
          100   S9
     45247267   FIRST
     22991329   SECOND
     15029246   THIRD
      6691829   FOURTH
       766600   BUFFER
        30401   (((FIRST OR SECOND) OR THIRD) OR
FOURTH)(2W)BUFFER
S10          6   S S9 AND ((FIRST OR SECOND OR THIRD
OR FOURTH)(2W)BUFFER)

?  TYPE S10/3,K/ALL
```

10/3K/1 (Item 1 from file: 348) Links
Fulltext available through: Order File History



00259932

Program mode access control system.
Zugriffssteuerungssystem mit Programmodus.
Systeme de commande d'acces a mode programme.

Patent Assignee:

- FUJITSU LIMITED; (211460)
  1015, Kamikodanaka Nakahara-ku; Kawasaki-shi Kanagawa 211; (JP)
  (applicant designated states: DE;FR;GB;SE)
- FUJITSU LIMITED... ;
  ; ;

Inventor:

- Masuda, Hiroki Dai-5 Yoshimura Haitsu 201
  17-11, Azamino 1-chome Midori-ku; Yokohama-shi Kanagawa 227; (JP)
- Kawamata, Tetsuo
  1-18-2, Minamidai Seya-ku; Yokohama-shi Kanagawa 246; (JP)

Legal Representative:

- Ritter und Edler von Fischern, Bernhard,Dipl.-Ing. et al (9671)
  Hoffmann, Eitle & Partner, Patentanwalte, Postfach 81 04 20; D-81904 Munchen; (DE)

| | Country | Number | Kind | Date | |
|---|---|---|---|---|---|
| Patent | EP | 260693 | A2 | 19880323 | (Basic) |
| | EP | 260693 | A3 | 19890222 | |
| | EP | 260693 | B1 | 19931222 | |
| Application | EP | 87113616 | | 19870917 | |
| Priorities | JP | 86219126 | | 19860919 | |

Designated States:
DE; FR; GB; SE;

International Patent Class (V7): G06F-013/12; ; Abstract Word Count: 133

| Type | Pub. Date | Kind | Text |
|---|---|---|---|

Publication: English
Procedural: English
Application: English

| Available Text | Language | Update | Word Count |
|---|---|---|---|
| CLAIMS B | (English) | EPBBF1 | 379 |
| CLAIMS B | (German) | EPBBF1 | 582 |
| CLAIMS B | (French) | EPBBF1 | 709 |
| SPEC B | (English) | EPBBF1 | 5342 |
| Total Word Count (Document A) 0 | | | |
| Total Word Count (Document B) 7012 | | | |
| Total Word Count (All Documents) 7012 | | | |

Specification: ...the communicating processors via direct memory access circuits. A processor stores messages in a send buffer in memory and controls a pointer in memory indicating the loading of such a buffer. The interface processor reads this pointer and the messages, and writes a pointer and the messages in a received buffer of a receiving processor. The interface processor limits the loading of new messages into the send buffer by delaying the updating of an unload pointer, creating memory space for new messages, until... ...the interface processor is a joint effort of the communication processors.

The send and receive buffers are first-in first-out memory and are used for storing messages.

EP-0125561 describes... ...processing engine and a byte-multiplexed bus coupled to multiple I/O devices. A multi-buffer adapter transfers data by cycle-steal (direct memory access) opertions between the channel and the bus. The adapter has multiple buffers switchable to

the channel in a burst mode by a channel interface and to the bus in a byte mode by a device-level interface.

The multi-buffer adapter includes first-in first-out memory devices in order to store at least one... explaining the operation of the system shown in Fig. 3; and

Fig. 8 is a flow chart for explaining the operation of the system shown in Fig. 3.

DESCRIPTION OF THE...a parity error is included or not) is recorded at the same time in the first-in first-out memory 19.

The microprocessor 17 reads the access information recorded in the first-in first-out... ...of the group of control registers 18a according to the access information, to control the input output device 15-0, 15-1, ..., 15-n. Therefore, if the high speed access for... ...3. In Fig. 4, 41a is a biport memory array, 41b, 41c are an input buffer and an output buffer respectively, 42a, 42b, are a write address pointer and a read address pointer, 43a, 43b... ...read control, and 44 is a flag-logic. The FIFO is applied as a rate buffer for sourcing and absorbing data at different rates, (eg. interfacing first processors and slow peripherals...to use the internal processor bus 16, and when the bus arbitration control circuit 32 obtains the right to use the internal processor bus 16 from the microprocessor 17, it then sends an acknowledgement of this right to use the internal processor bus 16 to the direct memory access control circuit 31. Then, the direct memory access control circuit 31 transfers the data... ...from the FIFO 29.

In the data transfer control due to the direct memory access control circuit 31 mentioned above, when the buffer memory is provided in the input output device 14 and this buffer memory is connected to the common bus 13, the construction in which the data can be transferred via this buffer memory with the main memory device can be obtained. Further, the kind of the number...

10/3K/2 (Item 2 from file: 348) Links
Fulltext available through: Order File History
EUROPEAN PATENTS

00202600
Input/output control system.
Ein/Ausgabe-Steuerungssystem.
Systeme de commande entree/sortie.

Patent Assignee:

- FUJITSU LIMITED; (211460)
  1015, Kamikodanaka Nakahara-ku; Kawasaki-shi Kanagawa 211; (JP)
  (applicant designated states: DE;FR;GB;SE)
- FUJITSU LIMITED... ;
  ; ;

Inventor:

- Sera, Akihiro
  5954-3, Yaho; Kunitachi-shi Tokyo 186; (JP)
- Goukon, Kazuhiko
  100, Sanmai-cho, Ida Nakahara-ku; Kawasaki-shi Kanagawa 211; (JP)
- Shibara, Yuji
  4-2-10, Masukata Tama-ku; Kawasaki-shi Kanagawa 214; (JP)

Legal Representative:

- Lehn, Werner, Dipl.-Ing. et al (7471)
  Hoffmann, Eitle & Partner Patentanwalte Arabellastrasse 4; W-8000 Munchen 81; (DE)

| | Country | Number | Kind | Date | |
|---|---|---|---|---|---|
| Patent | EP | 202675 | A2 | 19861126 | (Basic) |
| | EP | 202675 | A3 | 19890208 | |
| | EP | 202675 | B1 | 19921230 | |
| Application | EP | 86106922 | | 19860521 | |
| Priorities | JP | 85106835 | | 19850521 | |
| | JP | 85108337 | | 19850522 | |

Designated States:
DE; FR; GB; SE;

International Patent Class (V7): G06F-013/28; ; Abstract Word Count: 74

| Type | Pub. Date | Kind | Text |
|---|---|---|---|

Publication: English
Procedural: English
Application: English

| Available Text | Language | Update | Word |
|---|---|---|---|

| | | | Count |
|---|---|---|---|
| CLAIMS B | (English) | EPBBF1 | 1743 |
| CLAIMS B | (German) | EPBBF1 | 1535 |
| CLAIMS B | (French) | EPBBF1 | 1991 |
| SPEC B | (English) | EPBBF1 | 13418 |
| Total Word Count (Document A) 0 | | | |
| Total Word Count (Document B) 18687 | | | |
| Total Word Count (All Documents) 18687 | | | |

Specification: ...invention is to provide an IOC having a higher operation speed and simpler firmware relative to the aforementioned prior art IOC.

The above object is solved by the invention as claimed in claim ... ...the preferred embodiments with reference to the accompanying drawings, wherein:

Fig. 1 illustrates a typical and conventional input/output control system, mounting therein a one-chip microprocessor, and adjacent members thereof... ...chart exhibiting a series of operations generated by a CMR interruption;

Fig. 6B is a flow chart exhibiting a series of operations generated by an interruption for finish issued from the input...the central control unit CC.

(c) The program mode control register PMREG acts as a buffer for a data transfer under the program mode.

(d) The direct memory access mode data register DMAREG acts as a buffer for a data transfer under the DMA mode.

(e) The direct memory access mode control... ...The above-mentioned functional members operate as follows. In this explanation of the operations, a content of a control register will be first related, which control register stores program control words. The program control words, in the example, are loaded in the random access memory RAM.

Figure 2 shows a register structure...in construction, lies in the employment by the IOC system of Fig. 3 of a buffer memory. In the example of the present invention, the buffer memory is comprised of a first-in/first-out (FIFO) memory. For this, a selector... ...present invention, but is beneficial to the present invention. That is, the DIGC carries out a desired diagnostic check operation in cooperation with, under control of the microprocessor (mu)P and/or the central control unit CC, the circuit IDMACTL, the circuit DMACTL and the buffer memory (FIFO).

The buffer memory, e.g., the memory FIFO, momentarily stores the ...cooperating with the memory FIFO, achieves a control of a data transfer between the input/ output unit control circuit IOCTL and the memory FIFO.

In the IOC system, of the present invention, both a write... ...under a program mode (PM).

4 Control register (REG)

The register REG operates as a buffer register to store therein both control information for controlling the input/output control system IOC... ...microprogram, i.e., a control program, for the microprocessor (mu)P.

7 Random access memory (RAM)

The RAM momentarily stores therein a variety of information or data to be used in...The addresses 1000 through 1004, are allotted to the control register REG, which operates to buffer the program control words and so on for controlling the IOC system. More specifically, the... ...device status register DSR, 1001 to the file address register FAR, 1002 to the command register CMR, 1003 to the memory address register MAR, and 1004 to the word count register... ...allotted to the control register, mounted in the input/output unit control circuit IOCTL, which buffers control information for controlling the input/output unit IO.

7 In the example, the area ... ...4003 is not used.

8 The address 8000 is an area used for specifying a write or read operation with respect to the FIFO memory. The address 8000 is effective during...supplied along a route such as; unit DKU -> control circuit IOCTL -> line L3 (via a buffer amplifier indicated by triangle symbol) -> selector SEL -> input terminal D( sub(in)). The above read operation, commanded by the circuit IDMACTL, is commenced when certain conditions are satisfied. First, the transfer direction specifying flip-flop DIR F/F (corresponding to DIR at...F) Explanation of the FIFO memory (Fig. 7)

The FIFO memory is important as the buffer memory in the present invention, and therefore, will be explained in detail below.

Figure 7 illustrates a detailed example of the FIFO memory. The meanings of the characters D( sub(in)) , D( sub(out)) , W, R, FUL and EMP have already been...

Claims: ...comprising: an input/output unit control circuit (IOCTL) for controlling the input/output unit (IO), a data transfer being performed by accessing said input/output unit (IO) via said input/output unit control circuit (I0CTL); a buffer memory in which transfer data is momentarily stored; a direct memory access control means being... ...from a microprocessor ((mu)P) to achieve a data transfer control with respect to said buffer memory; and further, characterized in that a control register (REG) is provided in which a plurality of sets of data transfer control information, given from the central control unit (CC) are written; said... ...means of an internal bus (I-BUS), said microprocessor ((mu)P) having access to said buffer memory over said internal bus (I -BUS), and said direct memory access control means is comprised of an input/output unit direct memory access control circuit (IDMACTL) and a direct memory access control circuit (DMACTL), and in which the control circuit (IDMACTL) is operative to perform the data transfer between said buffer memory and the input/output unit control circuit (IOCTL), while the control circuit (DMACTL) is operative to perform the data transfer between the buffer memory and said common bus (C-BUS) located between the IOC system and the central... ...data transfers are performed without microprogram execution from said microprocessor ((mu)P), and therefore said buffer memory is disconnected from an internal bus (I-BUS) during the data transfer.

2. A... ...PMCTL) is connected with the common bus (C-BUS) to achieve the transfer control under a program mode (PM), and the microprocessor ((mu)P) is directly activated, via the control circuit... ...unit control circuit (IOCTL).

3. A system as set forth in claim 2, wherein said buffer memory is made of a first-in/first-out memory (FIFO).

4. A system as...

10/3K/3 (Item 1 from file: 349) Links
Fulltext available through: Order File History

PCT FULLTEXT



00762836

# CONGESTION CONTROL MECHANISM IN A NETWORK ACCESS DEVICE
# MECANISME DE REGULATION D'ENCOMBREMENT DANS UN DISPOSITIF D'ACCES A UN RESEAU

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| | Country | Number | Kind | Date |
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[OA] BF; BJ; CF; CG; CI; CM; GA; GN; GW; ML; MR; NE; SN; TD; TG;

[AP] GH; GM; KE; LS; MW; MZ; SD; SL; SZ; TZ; UG; ZW;

[EA] AM; AZ; BY; KG; KZ; MD; RU; TJ; TM;

Publication Language: English
Filing Language: English
Fulltext word count: 6638

English Abstract:

...of cells by the SAR logic is controlled in response to the settings of Generic Flow Control (GFC) bits appearing in the headers of ATM cells received by the SAR logic. The interface logic receives a congestion signal indicative of the level of congestion in a transmit buffer in the switch fabric. In response to the congestion signal, the interface logic sets the... ...transmission rate is maintained at a high average level while undesirable congestion in the transmit buffer is avoided. Hysteresis is employed in the setting of the GFC bits is response to...

Detailed Description:

...necessarily transmitted on a higher-throughput segment immediately upon receipt. Consequently, the access device employs buffering in order to manage the forwarding of received frames to an output segment.

Additionally, under... ...the frames received from incoming network segments. During such periods, incoming frames are placed in buffers temporarily, until outgoing transmission bandwidth is available to transmit the frames. The use of buffers thus reduces the need to discard frames due to a temporary shortage of outgoing transmission bandwidth.

Various parameters affect the need for buffering in a network access device. These parameters include the relationship between the aggregate data rate... ...data rate is high, for example on the order to 10:1 or greater, the buffers within the device may experience congestion when the lower-throughput segments are simultaneously bursting traffic... ...and checking. The AToM4 device also contains mechanisms to support traffic shaping, varieties of ATM flow control protocols, and operations Administration and Maintenance (OAM) flows.

In particular, the AToM4 provides operation in accordance with a standard ATM flow-control scheme known as Generic Flow Control (GFC). The transmission of cells from the AToM4 is controlled in accordance with GFC signalling... ...switch connected to the network access device in which the AToM4 resides. The switch exercises flow control by setting the GFC bits in ATM cells sent from the switch to the network access device. This flow control mechanism is used to prevent the network access device from contributing to undesirable congestion in... ...functions required in certain network access devices, its design does not address the problem of buffer congestion within the network access device. Additionally, the flow control functionality of the AToM4 has generally not been

widely used, because the GFC protocol per... ...functionality in the AToM4 device, as well as the cost of external logic for managing buffer congestion within the network access device.

BRIEF SUMMARY OF THE INVENTION

In accordance with the present invention, a mechanism for controlling the congestion of buffers in an ATM network access device is disclosed that exploits the flow-control capability of SAR devices such as the AToM4 device. The congestion control mechanism enhances efficiency by permitting the overbooking of buffers , while avoiding the undue discarding of ATM cells.

The congestion control mechanism includes SAR logic... ...sending of cells by the SAR logic is controlled in response to the settings of flow control bits appearing in the headers of ATM cells received by the SAR ...interface logic receives a congestion signal indicative of the level of fullness of a transmit buffer in the switch fabric. In response to the congestion signal, the interface logic sets the flow control bits in the headers of cells transferred to the SAR logic such that the cell... ...switch fabric is maintained at a high average level while undesirable congestion in the transmit buffer is avoided. In particular, the interface logic withholds sending indications to the SAR logic that... ...congestion signal from the switch fabric is asserted, indicating that a predetermined threshold of transmit buffer fullness is exceeded. In a disclosed technique, a credit-based flow control protocol is employed, and the permission indications sent from the interface logic to the SAR... ...more particular aspects, the disclosed congestion control mechanism employs hysteresis in the setting of the flow control bits to avoid unstable operation that might arise from an excessively fast response to the congestion signal. The disclosed interface logic also generates idle cells when necessary to provide flow control commands to the SAR logic during periods in which no traffic-carrying cells are being transferred from the switch fabric to the SAR logic.

The disclosed technique distributes the buffering of ATM cells between the buffer in the switch fabric and buffers associated with the SAR logic. The probability of cell discard is reduced, while desirable overbooking... ...Figure 1; Figure 3 shows the format of an ATM cell header used to convey flow control information in the LAN interworking card of Figure 2.

DETAILED DESCRIPTION OF THE INVENTION
Figure... ...FIFOs within each MAC device. Each MAC device also contains a transmit FIFO for transmit buffering. The receive and transmit FIFOs for each segment 32 interface to DMA logic 34 used...CPU subsystem 42.

When the DMA logic 34 receives a MAC frame, it creates a Buffer Descriptor and places it in packet memory 38 along with the received frame. The Buffer Descriptor contains information such as Ethernet source port 33, frame length, error status, packet data... ...Used to transfer frames between the PPUs 36 and the system SAR 40.

4. Free Buffer. Used to keep track of memory buffers that may be used to store frame data.

Each PPU 36 contains a Forwarding Engine... ...1d bridge, or LEC attached bridge.

Generally, frame processing commences with the reading of the Buffer Descriptor and MAC header information. The Buffer Descriptor tells the FE which logical processing unit should service the incoming frame, and whether... ...frame processing by a FE 48 is considered complete when the FE 48 updates the Buffer Descriptor and writes encapsulation data for the frame back into packet memory 38. FE updates of the Buffer Descriptor include populating a Connection ID (CID) field, setting a Frame Check Sequence (FCS) status... ...of f set to the start of packet data f rom.

the beginning of a buffer. The encapsulation data is used to form a corresponding frame including the frame payload for... ...by the FE 48. The DMA logic 34 returns the frame pointers to the Free Buffer Queue.

2. The search table lookup indicates that the current frame should be filtered. The...for a CID of a broadcast Virtual Circuit (VC). This CID is placed in the Buffer Descriptor, and the frame is transferred to the system SAR 40 to be sent on... ...queue in the cell memory 54 has a programmable list size, so that the available buffer space can be flexibly assigned among the VCs. The sum total of list sizes for... ...Ws can be larger than the total amount of available memory space to provide statistical buffer gain. Once a VC queue reaches its programmed limit within the system SAR 40, subsequent... ...to the ATM Interface Unit 22 of Figure 1. Also, the bits in a Generic Flow Control (GFC) field of the outgoing cells are forced to zero. This operation is described in... ...A user data cell is translated through a VC Translation

Table and stored in a first cell buffer region 64 of a cell buffer memory 65 for forwarding to the system SAR 40.

2. A LAN emulation control frame (as opposed to an in-band frame) is placed untranslated into a second cell buffer region 66 of the cell buffer memory 65 for forwarding to the CPU subsystem 42.

3. Management cells are placed untranslated into the second cell buffer region 66 for forwarding to the CPU subsystem 42.

User data cells are reassembled into... ...a time division multiplexed access manner.

From each frame, the DMA logic 34 forms a Buffer Descriptor based on the CID, Encapsulation Type, Bridge ID,, frame length, and the fact that... PHY/MAC circuitry 30.

Each MAC controller contains a 256-byte transmit FIFO used to buffer outgoing frames. The DMA logic transfers frames into the transmit FIFO from the packet memory... ...the data onto the Ethernet media.

As previously mentioned, the network access device incorporates a flow control mechanism to obtain the efficiency benefits of overbooking connections without causing undue discarding of frames. Within the ATM interface unit 22 of Figure 1,, a 2 MB transmit buffer memory is used to provide elasticity in the transfer of cells from the service units 18 and 20 to the STM line unit 10. During initialization, the transmit buffer space is partitioned for use by the separate service units. The ATM interface unit 22 contains logic that monitors the level of fullness of the separate buffers for the service units. When the monitoring logic detects a predetermined threshold level of fullness in a buffer, it sends a congestion signal to the respective service unit via a logical serial connection... ...the transmission line 62. The congestion signal is a binary signal indicating whether or not buffer fullness exceeds the threshold level.

There are separate congestion signals for each service unit that ... ...SCBI logic 56 and the system SAR 40. The header contains a 4-bit Generic Flow Control (GFC) field used to carry flow control signals used by the flow control logic within the system SAR 40. The GFC field is only used within the LAN... ...connections for which the

sending of cells by the system
SAR 40 is subject to flow control using GFC information.

In the illustrated embodiment, controlled connections
include those providing Available Bit Rate... ...Rate (CBR) and Variable Bit Rate (VBR)
services are "uncontrolled",, i.e., not subject to flow
control via GFC.

The GFC bits are used in a credit-based flow control
scheme. The system SAR 40 maintains a 2-bit counter used
to control the sending... ...all connections

SET-A 0 - not set Receipt of SET A causes
the 2-bit flow control
1 - set counter to be
incremented, but not
beyond 2.

unused 0 Always 0.

3... ...Indicates whether cell
belongs to a controlled
1 - cntrld or uncontrolled
connection. if
controlled, the flow
control counter has been
decremented. If the count
is 0, no more cells are
sent for...the GFC field in
cells sent by the system SAR 40. The decrementing of the
flow control counter and the inhibiting of cell sending
is performed only if GFC operation is enabled... ...sends SET-A
indications to the system SAR 40 in accordance with the
credit-based flow control protocol.

A congestion control mechanism in a network access
device has been described. It will...

Claims:

...interface,
each received data unit including a f low-control f ieldused to send flow control commands
to the SAR logic inaccordance with a flow-control protocol, the SAR logicbeing operative to
send data units on the flow-controlledconnections when it has received a permission
indicationin the flow-control fields of received data units, and tootherwise inhibit the
sending of data units on... ...receiving a congestionsignal from the switch fabric indicating
whether thefullness of the transmit buffer exceeds a thresholdlevel, the interface logic being

operative when thecongestion signal is deasserted... ...include permissionindications in data units sent to the SAR logic inaccordance with the flow-control protocol, and theinterface logic being operative when the congestionsignal is asserted to withhold... ...the SARlogic, and wherein the data units utilized by theinterface logic for sending flow control commands to theSAR logic include both the traffic-carrying data unitsand the idle... ...to the delay inwithholding permission indications.

7 Apparatus according to claim 1. wherein the flow
control protocol is a credit-based flow control protocol,and wherein the permission indications are creditindications.

8 Apparatus according to claim 7, wherein the SAR logic
maintains a flow-control counter to control the sendingof data units on the flow-controlled connections,, andwherein the SAR logic is operative to decrement the flowcontrol counter when a data unit is sent to the interfacelogic on a flow-controlled connection and increment the flow-control counter when a credit indication is receivedfrom the interface logic, and wherein the SAR... ...data units tothe interface logic on flow-controlled connections whenthe value of the flow-control counter reaches apredetermined value.

9 Apparatus according to claim 8, wherein the
predetermined value...

10/3K/4 (Item 2 from file: 349) Links
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PCT FULLTEXT

00562111
FRAME BASED QUALITY OF SERVICE
QUALITE DE SERVICE AXEE SUR DES TRAMES

Patent Applicant/Patent Assignee:

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  ; ;

- FUJITSU NETWORK COMMUNICATIONS INC... ;
  ; ;



| | Country | Number | Kind | Date |
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Detailed Description:

...used to process data units
received over the connection. For example, resources such
as receive buffers, receive queues, flow control credits
and output link bandwidths are each managed in a way that
reflects the QoS... ...an illustrative format for a queue entry;
Fig. 8 shows an illustrative format for a buffer pool
descriptor;
Fig. 9 shows an illustrative format for a buffer
descriptor;
Fig. 10 shows an illustrative format of a scheduling
table;
Fig. 11 shows steps...which the frame 16 was received. The connection
descriptor 24 includes pointers indicating 1) a buffer
pool from which buffers are to be allocated to store the
frame 16, 2) a queue list 27 having... ...descriptor 28. Portions of the frame 16 are stored in a
linked list of frame buffers 38 associated with a queue
entry 34b at the tail of the queue associated with the
queue descriptor 30b. Accordingly, as illustrated in Fig.

1, the frame buffers 36 associated with the queue entry 34a store portions of another, previously received, frame.

Frame buffers for storing a received frame are allocated from a buffer pool associated with the queue list for that received frame. Accordingly, when the frame 16 is received by the network switch 10, the receiver unit 18 determines a buffer pool associated with the connection from the connection identifier 17. For example, the connection descriptor... ...using the connection handle 20 may contain an identifier or pointer indicating one of the buffer pool descriptors 41 that is associated with a buffer pool to be used to receive the frame 16. The frame 16 is then stored within the buffer pool. Buffers storing portions of the frame are linked together in a linked list of frame buffers, shown as frame buffers 38 in Fig. 1, and associated with the queue entry 34b at the tail of... ...the frame enqueuing logic 26 are further described below with reference to Fig. 2. The buffer accounting logic 45 maintains the buffer pools associated with the buffer pool descriptors 41, in response to allocation and deallocation of buffers by the receiver unit 18 and transmit unit 42, respectively.

As bandwidth associated with the... ...list for that QOS group. In an illustrative embodiment, in which the QFC credit based flow control protocol may be used in association with at least one virtual connection, transmit credits may ...traversal logic 40, frame enqueuing logic 26, rate policing logic 48, transmit unit 42, and buffer accounting logic 45, in association with the data structures also shown in Fig. 1, may... ...the frame at the head of the queue from one or more of the frame buffers in the frame buffer list storing the frame itself.

At step 75 the queue traversal logic 40 determines is... ...the frame at the head of the selected queue is associated with a credit based flow control protocol, for example by reading a field within the queue entry for the frame. If... ...frame at the head of the selected queue is associated with a store and forward flow control mode.

Such a determination may, for example, be made by reading a field within ...queue entry for the frame. If the frame is associated with a store and forward flow control mode, then step 76 is followed by step 78. Otherwise step 76 is followed by... ...Since at step 78 the frame is known to be associated with store and

forward flow control, the number of available transmit
credits associated with the queue list must be at least... ...logic determines whether indication of
a frame has previously been stored in a set-aside buffer
during the current queue list traversal. if so, then step
81 is followed by step... ...indication, such as a pointer, identifying the frame for
future reference, into the set-aside buffer. Accordingly,
step 84 is only performed once per queue list traversal.

In this way, once... ...information
related to an associated virtual connection. The
connection descriptor 100 is shown including a buffer pool
identifier 102, for indicating receive buffer memory
associated with the connection. Buffers may be allocated
from a buffer pool associated with the connection to store
received frames associated with the connection. A queue... ...in the connection descriptor 100, a QFC
enable field 108 indicates whether a credit based flow
control protocol, such as Quantum Flow Control (QFC) . is
to be applied to frames received over the associated
connection. A flow control mode field 110 indicates
whether a store and forward or cut-through flow control
mode is to be used for frames received over the
connection. In general, because the ...6
control mode permits transmission of a frame to begin
before the transmitter has sufficient flow control credits
to transmit the complete frame, it is used to support
those connections which are relatively more delay
sensitive. Because connections which employ cut-through
flow control may create head of queue blocking,
performance of lower priority connections using store and
forward flow control may suffer as a result. Accordingly,
store and forward flow control is generally used for
connections which are relatively less delay sensitive.

other fields within the... ...maximum
number of fixed sized data units, such as cells, which may
be stored in buffers associated with queue entries in the
queue. A queue size field 174 may be used... ...this way the
disclosed system determines the amount of received data
currently stored in frame buffers associated with the
queue entries of the queue. The frame enqueuing logic 26
increments this... ...The value stored in the time-stamp
range selection field 176 is copied to the buffer
descriptor (see Fig. 9) for the first frame buffer of each
frame stored in the queue as received frames are enqueued
by the frame...queue entry 200 stores a data unit associated with cut through or store-and-forward flow control mode. A QFC
-2 0

enable field 206 is used to store an indication of... ...206 indicates that the associated frame is being sent over a QFC connection,, then QFC flow control is applied to the frame.

As further shown in the queue entry' format 200 of... ...to be guaranteed bandwidth traffic. A frame pointer field 210 stores a pointer to a first frame buffer storing a portion of a frame associated with the queue entry 200.

An illustrative format for a buffer pool descriptor 211 is shown in Fig. 8. The buffer pool descriptor 211 shown in Fig. 8, for example, corresponds to the buffer pool descriptors 41 shown in Fig. 1. Initial values for the fields shown in the buffer pool descriptor 211 may be written by software executing on the processor 44 shown in Fig. 1. As shown in Fig. 8, the buffer pool descriptor 211 includes a buffer pool enable field 212, a current individual buffer count field 213, a current shared buffer count field 214, and an assigned shared buffer count field 215. The value of the buffer pool enable field 212 indicates whether a buffer pool associated with the buffer pool descriptor 211 is available for crediting and debiting of buffers. The value of the current individual buffer count field 213 indicates the number of dedicated buffers currently available to this buffer pool. The dedicated buffers associated with a buffer pool are available exclusively to the QoS group associated with that buffer pool, and are not shared with other QoS groups. The value of this field is decremented each time the associated buffer pool is debited, for example, by the frame enqueuing logic 26 of Fig. 1 in response to use of a dedicated buffer from the associated buffer pool to store a portion of a received data unit. The value of this field may be incremented each time the associated buffer pool is credited, for example, by the transmit unit 42 when a received frame stored in a dedicated buffer is transmitted out of the network switch 10 as shown in Fig.

1.

The value of the current shared buffer count field 214 indicates the number of shared buffers currently available to the buffer pool associated with the buffer pool descriptor 211. Shared buffers available to the associated buffer pool may also be used by QoS groups associated with other buffer pools. The value of the current shared buffer count field 214 may be incremented and decremented in response to shared buffers being added

and removed from the pool, for example, by the transmit unit 42 and... ...enqueuing logic 26 as shown in Fig. 1 respectively.

The value of the assigned shared buffer count 215 indicates the number of shared buffers assigned to the associated buffer pool. This value is the number of
-22
buffers within the buffer pool which may be shared with other buffer pools. In an illustrative embodiment, in which the buffer pool of a buffer is indica ted by a field within the buffer descriptor for that buffer, the value of the current shared buffer count is compared to the value of the assigned shared buffer count field 215 during returns of buffers to the associated buffet pool. If the values are equal, the value of the current individual buffer count field 213 is incremented.

Fig. 9 shows an illustrative format of a buffer descriptor 220 corresponding to the frame buffers 36 and shown in Fig. 1. A next buffer pointer field 222 indicates the address of a next frame buffer in a multi buffer frame. A byte-count field 224 stores a value indicating the number of bytes of a data unit that are stored in the frame buffer associated with the buffer descriptor 220.

A time-stamp range selection field 226 stores an acceptable range with respect...end of packet") field 230 may be used to store an indication that the frame buffer associated with the buffer descriptor 220 is the last buffer of a frame.

The SOP field 232 may be used to store a value indicating that the frame buffer associated with the buffer descriptor 220 is the first buffer of a frame. Where both the EOP field 230 and SOP field 232 are asserted, then the frame is contained in a single

buffer. Indication of the buffer pool from which the buffer associated with the buffer descriptor 220 was allocated may also be stored in is the buffer descriptor 220. Such an indication may be used during buffer returns in order to identify the proper buffer pool that a buffer is to be returned to.

An illustrative format of a scheduling table 240 is shown... ...In an illustrative embodiment, the event time stamp is written into a field within a buffer descriptor storing a first portion of the data unit received at step 300. The

time stamp field 228 in the buffer descriptor 220 as
described in connection with Fig. 9 may be used for this
purpose... ...into
a field within an internal data unit header, as would be
stored within the buffer itself which stores a first
portion of the received data unit.

-2 6
At step... ...step of accepting the data unit may
for example, include enqueuing one or more receive buffers
storing the data unit to a receive queue within a queue
list associated with the...

Claims:

...processing data units received over said plurality of
virtual connections includes at least one receive buffer.
12 The method of claim 1, wherein said first resource for
processing data units received... ...forprocessing data units received over said plurality
ofvirtual connections includes at least one flow controlcredit.
14 The method of claim 1, wherein said first resource for
processing data units...processing data units received over said plurality ofvirtual connections
includes at least one receive buffer.
26 The system of claim 15, wherein said first resource
for processing data units received... ...for processing data units received over said plurality
ofvirtual connections includes at least one flow controlcredit.
28 The system of claim 15, wherein said first resource
for processing data units...

10/3K/5 (Item 3 from file: 349) Links
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00562090
EVENT BASED RATE POLICING WITH A JUMPING WINDOW
CONTROLE DE DEBIT A EVENEMENT AVEC SAUT DE FENETRE

Patent Applicant/Patent Assignee:

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  ; ;

- FUJITSU NETWORK COMMUNICATIONS INC... ;
  ; ;

| | Country | Number | Kind | Date |
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| Priorities | US | 98105825 | | 19981027 |

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Publication Language: English
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Detailed Description:

...illustrative format for a queue entry;
is
Fig. 8 shows an illustrative format for a buffer pool
descriptor;
Fig. 9 shows an illustrative format for a buffer
descriptor;
Fig. 10 shows an illustrative format of a scheduling
table;
Fig. 11 shows steps... ...which the frame 16 was received. The connection
descriptor 24 includes pointers indicating 1) a buffer
pool from which buffers are to be allocated to store the
frame 16, 2) a queue list 27 having... ...descriptor 28. Portions of the frame 16 are stored in a
linked list of frame buffers 38 associated with a queue
entry 34b at the tail of the queue associated with the
queue descriptor 30b. Accordingly, as illustrated in
Fig. 1, the frame buffers 36 associated with the queue
entry 34a store portions of another, previously received,
frame.

Frame buffers for storing a received frame are allocated from a buffer pool associated with the queue list for that received frame. Accordingly, when the frame 16 is received by the network switch 10, the receiver unit 18 determines a buffer pool associated with the connection from the connection identifier 17. For example, the connection descriptor... ...using the connection handle 20 may contain an identifier or pointer indicating one of the buffer pool descriptors 41 that is associated with a buffer pool to be used to receive the frame 16. The frame 16 is then stored within the buffer pool. Buffers storing portions of the frame are linked together in a linked list of frame buffers, shown as frame buffers 38 in Fig. 1, and associated with the queue entry 34b at the tail of...the frame enqueuing logic 26 are further described below with reference to Fig. 2. The buffer accounting logic 45 maintains the buffer pools associated with the buffer pool descriptors 41, in response to allocation and deallocation of buffers by the receiver unit 18 and transmit unit 42, respectively.

As bandwidth associated with the... ...list for that QoS group. In an illustrative embodiment, in which the QFC credit based flow control protocol may be used in association with at least one virtual connection, transmit credits may ... ...logic 40, frame enqueuing logic 26, rate policing logic 48.r transmit unit 42, and buffer accounting logic 45, in association with the data structures also shown in Fig. 1, may...f rame at the head of the queue from one or more of the frame buffers in the frame buffer list storing the frame itself.

At step 75 the queue traversal logic 40 determines whether the frame at the head of the selected queue is associated with a credit based flow control protocol, for example by reading a field within the queue entry for the frame. If... ...frame at the head of the selected queue is associated with a store and forward flow control mode.

Such a determination may, for example, be made by reading a field within the queue entry for the frame. If the frame is associated with a store and forward flow control mode, then step 76 is followed by step 78. Otherwise step 76 is followed by... ...at step 78 the frame is known to be associated with is store and forward flow control, the number of available transmit credits associated with the queue list must be at least... ...logic determines

whether indication of a frame has previously been stored in a set-aside buffer during the current queue list traversal. If so, then step 81 is followed by step... ...indication, such as a pointer, identifying the frame for future reference, into the set aside buffer. Accordingly, step 84 is only performed once per queue list traversal. In this way, once... information related to an associated virtual connection. The connection descriptor 100 is shown including a buffer pool identifier 102, for indicating receive buffer memory associated with the connection. Buffers may be allocated from a buffer pool associated with the connection to store received frames associated with the connection. A queue... ...in the connection descriptor 100, a QFC enable field 108 indicates whether a credit based flow control protocol, such as Quantum Flow Control (QFC), is to be applied to frames received over the associated connection. A flow control mode field 110 indicates whether a store and forward or cut-through flow control mode is to be used for frames received over the connection. In general, because the cut-through flow control mode permits transmission of a frame to begin is before the transmitter has sufficient flow control credits to transmit the complete frame, it is used to support those connections which are relatively more delay sensitive. Because connections which employ cut-through flow control may create head of queue blocking, performance of lower priority connections using store and forward flow control may suffer as a result.

Accordingly, store and forward flow control is generally used for connections which are relatively less delay sensitive.

Other fields within the...maximum number of fixed sized data units, such as cells, which may be stored in buffers associated with queue entries in the queue. A queue size field 174 may be used... ...this way the disclosed system determines the amount of received data currently stored in frame buffers associated with the queue entries of the queue. The frame enqueuing logic 26 increments this... ...The value stored in the time-stamp range selection field 176 is copied to the buffer descriptor (see Fig. 9) for the first frame buffer of each frame stored in the queue as received frames are enqueued by the frame... ...a next queue entry residing on the same queue as the queue entry 200. A flow control mode field 204 indicates whether the frame associated with the queue entry 200 stores a data unit associated with cut-through or store-and-forward flow control mode.

A QFC enable field 206 is used to store an indication of whether the... ...206 indicates that the associated frame is being sent over a QFC connection, then QFC flow control is applied to the frame.

As further shown in the queue entry format 200 of... ...to be guaranteed bandwidth traffic. A frame pointer field 210 stores a pointer to a first frame buffer storing a portion of a frame associated with the queue entry 200.

An illustrative format for a buffer pool descriptor 211 is shown in Fig. 8. The buffer pool descriptor 211 shown in Fig. 8, for example, corresponds to the buffer pool descriptors 41 shown in Fig. 1. Initial values for the fields shown in the buffer pool descriptor 211 may be written by software executing on the processor 44 shown in Fig. 1. As shown in Fig. 8, the buffer pool descriptor 211 includes a buffer pool enable field 212, a current individual buffer count field 213, a current shared buffer count field 214, and an assigned shared buffer count field 215. The value of the buffer pool enable field 212 indicates whether a buffer pool associated with the buffer pool descriptor 211 is available for crediting and debiting of buffers. The value of the current individual buffer count field 213 indicates the number of dedicated buffers currently available to this buffer pool. The dedicated buffers associated with a buffer pool are available exclusively to the QoS group associated with that buffer pool, and are not shared with other QoS groups. The value of this field is decremented each time the associated buffer pool is debited, for example, by the frame enqueuing logic 26 of Fig. 1 in response to use of a dedicated buffer from the associated buffer pool to store a portion of ...received data unit. The value of this field may be incremented each time the associated buffer pool is credited, for example, by the transmit unit 42 when a received frame stored in a dedicated buffer is transmitted out of the network switch 10 as shown in Fig.

1.

The value of the current shared buffer count field 214 indicates the number of shared buffers currently available to the buffer pool associated with the buffer pool descriptor 211. Shared buffers available to the associated buffer pool may also be used by QoS groups associated with other buffer pools. The value of the

current shared buffer count field 214 may be incremented and decremented in response to shared buffers being added and removed from the pool,, for example, by the transmit unit 42 and... ...enqueuing logic 26 as shown in Fig. 1 respectively.

The value of the assigned shared buffer count 215 indicates the number of shared buffers assigned to the associated buffer pool. This value is the number of buffers within the buffer pool which may be shared with other buffer pools. In an illustrative embodiment, in which the buffer pool of a buffer is indicated by a field within the buffer descriptor for that buffer, the value of the current shared buffer count is compared to the value of the assigned shared buffer count field 215 during returns of buffers to the associated buffer pool.

-2 5
If the values are equal, the value of the current individual buffer count field 213 is incremented.

Fig. 9 shows an illustrative format of a buffer descriptor 220 corresponding to the frame buffers 36 and 38 shown in Fig. 1. A next buffer pointer field 222 indicates the address of a next frame buffer in a multi buffer frame. A byte-count field 224 stores a value indicating the number of bytes of a data unit that are stored in the frame buffer associated with the buffer descriptor 220.

A time-stamp range selection field 226 stores an acceptable range with respect... ...end of packet") field 230 may be used to store an indication that the frame buffer associated with
-2 6the buffer descriptor 220 is the last buffer of a frame.

The SOP field 232 may be used to store a value indicating that the frame buffer associated with the buffer descriptor 220 is the first buffer of a frame. Where both the EOP field 230 and SOP field 232 are asserted, then the frame is contained in a single buffer .

Indication of the buffer

pool from which the buffer
associated with the buffer descriptor 220 was allocated may also be stored in the buffer descriptor 220. Such an indication may be used during buffer returns in order to identify the proper buffer pool that a buffer is to be returned to.

An illustrative format of a scheduling table 240 is shown...In an illustrative embodiment, the event time stamp is written into a field within a buffer descriptor storing a first portion of the data unit received at step 300. The time stamp field 228 in the buffer descriptor 220 as described in connection with Fig. 9 may be used for this purpose... ...into a field within an internal data unit header, as would be stored within the buffer itself which stores a first portion of the received data unit.

-2 9
At step...of
is accepting the data unit may for example, include enqueuing one or more receive buffers storing the data unit to a receive queue within a queue list associated with the...

Claims:

...indicator is a flag in a descriptor data structure associated with at least one memory buffer storing saiddata unit.
7 The method of claim 2, wherein said starting said new... ...indicator is a flag in a descriptor data structure associated with at least one memory buffer storing saiddata unit.
17 The system of claim 12, wherein said rate policing logic...

10/3K/6 (Item 4 from file: 349) Links
Fulltext available through: Order File History
PCT FULLTEXT

00561847
NETWORK TO NETWORK PRIORITY FRAME DEQUEUING
SORTIE DE FILE D'ATTENTE DE BLOCS PRIORITAIRES DE RESEAU A RESEAU

Patent Applicant/Patent Assignee:

- FUJITSU NETWORK COMMUNICATIONS INC;
  ; ;

- FUJITSU NETWORK COMMUNICATIONS INC... ;
  ; ;

| | Country | Number | Kind | Date |
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English Abstract:

...was received, and for which there are sufficient transmission credits available (43), based on a flow control mode (32, 34, 36, 38) associated with the data unit (16). If no such guaranteed... ...for which there are sufficient transmission credits available (43) to begin transmission based on a flow control mode (32, 34, 36, 38) associated with the data unit (16). If no such available...

Detailed Description:

...as Asynchronous Transfer
Mode (ATM) or Frame Relay. Such devices typically include
some amount of buffer memory to store data units as they
-2
are received, together with some combination of... ...such data
units for transmission.

Virtual connections passing through a network switch
typically employ a flow control protocol, which controls
when data units buffered at each node traversed by the
virtual connection may be forwarded downstream. An

example of a credit based flow control protocol providing QoS guarantees in an ATM environment is described in is Quantum Flow Control, Version 2.0, published July 25, 1995r available on the World Wide Web at http://www.qfc.org. The Quantum Flow Control (QFC) protocol requires a transmitting device to have received sufficient transmit credits from the next... ...the transmitting device logically decrements a transmit credit count. As the downstream node frees up buffers which can be used to receive more frames, it sends transmit credits upstream to the... ...transmit a complete frame before it can begin transmitting that frame, QFC ensures that downstream buffers are available to store the frame.

However, this requirement may also introduce undesirable or unacceptable... ...which they are forwarded to their respective output links. In addition, the system should provide flow control in a way that is consistent with the relative priorities of received data units.

BRIEF ...list includes a number of entries, and each entry is associated with one or more buffers for storing portions of a received data unit. A received data unit, having a length equal to some number of transmission credits, is associated with a virtual connection and a flow control mode. A number of transmission credits are maintained in association with the prioritized queue list... ...bit values they contain.

The disclosed system provides both "cut through" and "store and forward" flow control modes. Data units and/or queues having a relatively high priority are associated with the cut through flow control mode. When store and forward flow control is employed, transmission of a data unit cannot begin until there are sufficient transmit credits available to transmit the whole data unit. When cut through flow control is employed, portions of a data unit may be transmitted as applicable transmit credits become... ...which it is stored.

If such a data unit is found, and a credit based flow control protocol is in use, then the system checks whether there are sufficient transmission credits available to transmit the data unit, based on the flow control mode for that data unit. If no such guaranteed bandwidth data unit is found, the... ...data unit for which there are sufficient transmission credits available, as indicated by the associated flow control mode. If no available bandwidth data unit is found for which there are sufficient

transmission... ...data units are forwarded to
their respective output links. Additionally, the
disclosed system provides two flow control modes
reflecting the relative priorities of received data units.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS... ...illustrative format for a queue
entry;
-8
Fig. 8 shows an illustrative format for a buffer po6l
descriptor;
Fig. 9 shows an illustrative format for a buffer
descriptor;
Fig. 10 shows an illustrative format of a scheduling
table;
Fig. 11 shows steps...which the frame 16 was received. The connection
descriptor 24 includes pointers indicating 1) a buffer
pool from which buffers are to be allocated to store the
frame 16, 2) a queue list 27 having... ...descriptor 28. Portions of the frame 16 are stored in a
linked list of frame buffers 38 associated with a queue
entry 34b at the tail of the queue associated with the
queue descriptor 30b. Accordingly, as illustrated in Fig.

1, the frame buffers 36 associated with the queue entry
34a store portions of another, previously received, frame.

Frame buffers for storing a received frame are
allocated from a buffer pool associated with the queue
list for that received frame. Accordingly, when the frame
16 is received by the network switch 10, the receiver unit
18 determines a buffer pool associated with the connection
from the connection identifier 17. For example, the
connection descriptor... ...using the connection
handle 20 may contain an identifier or pointer indicating
one of the buffer pool descriptors 41 that is associated
with a buffer pool to be used to receive the frame 16. The
frame 16 is then stored within the buffer pool. Buffers
storing portions of the frame are linked together in a
linked list of frame buffers, shown as frame buffers 38 in
Fig. 1, and associated with the queue entry 34b at the
tail of... ...the frame enqueuing logic 26 are
further described below with reference to Fig. 2. The
buffer accounting logic 45 maintains the buffer pools
associated with the buffer pool descriptors 41, in
response to allocation and deallocation of buffers by the
receiver unit 18 and transmit unit 42, respectively.

As bandwidth associated with the... ...list for that QoS group. In an
illustrative embodiment, in which the QFC credit based
flow control protocol may be used in association with at

least one virtual connection, transmit credits may ... ...logic 4 0, frame enqueuing logic 26, rate
policing logic 48, transmit unit 42, and buffer accounting
logic 45, in association with the data structures also
shown in Fig. 1, may...the frame
at the head of the queue from one or more of the frame
buffers in the frame buffer list storing the frame itself.

At step 75 the queue traversal logic 40 determines
whether the frame at the head of the selected queue is
associated with a credit based flow control protocol, for
example by reading a field within the queue entry for the
frame. If... ...frame at the head of the selected queue is
associated with a store and forward flow control mode.

Such a determination may, for example, be made by reading
a field within the queue entry for the frame. If the
frame is associated with a store and forward flow control
mode, then step 76 is followed by step 78. Otherwise step
76 is followed by...Since at
step 78 the frame is known to be associated with store and
forward flow control, the number of available transmit
credits associated with the queue list must be at least... ...logic determines whether indication of
a frame has previously been stored in a set-aside buffer
during the current queue list traversal. If so, then step
81 is followed by step... ...indication, such as a pointer, identifying the frame for future reference, into the set-aside buffer. Accordingly,
step 84 is only performed once per queue list traversal.

In this way, once... ...information
related to an associated virtual connection. The
connection descriptor 100 is shown including a buffer pool
identifier 102, for indicating receive buffer memory
associated with the connection. Buffers may be allocated
from a buffer pool associated with the connection to store
received frames associated with the connection. A queue... ...in the connection descriptor 100, a QFC
enable field 108 indicates whether a credit based flow
control protocol, such as Quantum Flow Control (QFC), is
to be applied to frames received over the associated
connection. A flow control mode field 110 indicates
whether a store and forward or cut-through flow control
mode is to be used for frames received over the
connection. In general, because the cut-through flow
control mode permits transmission of a frame to begin
before the transmitter has sufficient flow control credits
to transmit the complete frame, it is used to support
those connections which are relatively more delay

sensitive. Because connections which employ cut-through flow control may create head of queue blocking, performance of lower priority connections using store and forward flow control may suffer as a result. Accordingly, store and forward flow control is generally used for connections which are relatively less delay sensitive.

Other fields within the...maximum number of fixed sized data units, such as cells, which may be stored in buffers associated with queue entries in the queue. A queue size field 174 may be used... ...this way the disclosed system determines the amount of received data currently stored in frame buffers associated with the queue entries of the queue. The frame enqueuing logic 26 increments this... ...The value stored in the time-stamp range selection field 176 is copied to the buffer descriptor (see Fig. 9) for the first frame buffer of each frame stored in the queue as received frames are enqueued by the frame...a next queue entry residing on the same queue as the queue entry 200. A flow control mode field 204 indicates whether the frame associated with the queue entry 200 stores a data unit associated with cut through or store-and-forward flow control mode. A QFC enable field 206 is used to store an indication of whether the... ...206 indicates that the associated frame is being sent over a QFC connection, then QFC flow control is applied to the frame.

As further shown in the queue entry format 200 of... ...to be guaranteed bandwidth traffic. A frame pointer field 210 stores a pointer to a first frame buffer storing a portion of a frame associated with the queue entry 200.

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An illustrative format for a buffer pool descriptor 211 is shown in Fig. 8. The buffer pool descriptor 211 shown in Fig. 8, for example,, corresponds to the

buffer pool descriptors 41 shown in Fig. 1. Initial values for the fields shown in the buffer pool descriptor 211 may be written by software executing on the processor 44 shown in Fig. 1. As shown in Fig. 8, the buffer pool descriptor 211 includes a buffer pool enable field 212, a current individual buffer count field 213, a current shared buffer count field 214, and an assigned shared buffer count field 215. The value of the buffer pool enable field 212 indicates whether a buffer pool associated with the buffer

pool descriptor 211 is available for crediting and debiting of buffers. The value of the current individual is buffer count field 213 indicates the number of dedicated buffers currently available to this buffer pool. The dedicated buffers associated with a buffer pool are available exclusively to the QoS group associated with that buffer pool, and are not shared with other QoS groups. The value of this field is decremented each time the associated buffer pool is debited, for example, by the frame enqueuing logic 26 of Fig. 1 in response to use of a dedicated buffer from the associated buffer pool to store a portion of a received data unit. The value of this field may be incremented each time the associated buffer pool is credited, for example, by the transmit unit 42 when a received frame stored in a dedicated buffer is transmitted out of the network switch 10 as shown in Fig.

1.

The value of the current shared buffer count field 214 indicates the number of shared buffers currently available to the buffer pool associated with the buffer pool descriptor 211. Shared buffers available to the associated buffer pool may also be used by QoS groups associated with other buffer pools. The value of the current shared buffer count field 214 may be incremented and decremented in response to shared buffers being added and removed from the pool, for example, by the transmit unit 42 and... ...enqueuing logic 26 as shown in Fig. 1 respectively.

The value of the assigned shared buffer count 215 indicates the number of shared buffers assigned to the associated buffer pool. This value is the number of buffers within the buffer pool which may be shared with other buffer pools. In an illustrative embodiment, in which the buffer pool of a buffer is indicated by a field within the buffer descriptor for that buffer, the value of the current shared buffer count is compared to the value of the assigned shared buffer count field 215 during returns of buffers to the associated buffer pool. If the values are equal, the value of the current individual buffer count field 213 is incremented.

Fig. 9 shows an illustrative format of a buffer descriptor 220 corresponding to the frame buffers 36 and shown in Fig. 1. A next buffer pointer field 222 indicates the address of a next frame buffer in a multi buffer frame. A byte-count field 224 stores a value

indicating the number of bytes of a data unit that are stored in the frame buffer associated with the buffer descriptor 220.

A time-stamp range selection field 226 stores an acceptable range with respect...end of packet") field 230 may be used to store an indication that the frame buffer associated with the buffer descriptor 220 is the last buffer of a frame.

The SOP field 232 may be used to store a value indicating that the frame buffer associated with the buffer descriptor 220 is the first buffer of a frame. Where both the EOP field 230 and SOP field 232 are asserted, then the frame is contained in a single buffer. Indication of the buffer pool from which the buffer associated with the buffer descriptor 220 was allocated may also be stored in the buffer descriptor 220. Such an indication may be used during buffer returns in order to identify the proper buffer pool that a buffer is to be returned to.

An illustrative format of a scheduling table 240 is shown ... ...In an illustrative embodiment, the event time stamp ils written into a field within a buffer descriptor storing a first portion of the data unit received at step 300. The time stamp field 228 in the buffer descriptor 220 as described in connection with Fig. 9 may be used for this purpose... ...into a field within an internal data unit header, as would be stored within the buffer itself which stores a first portion of the received data unit.

At step 306, the...step of accepting the data unit may for example, include enqueuing one or more receive buffers storing the data unit to a receive queue within a queue list associated with the...

Claims:

...3, further comprising:
at least one of said received data units associatedwith a first flow control mode;at least one of said received data units associatedwith a second flow control mode; and-3 9said flow control logic further including logic fordetermining that said number of available transmissioncredits is sufficient... ...one of saidat least one of said received data units associated withsaid first flow control mode.
5 The system of claim. 4, wherein each of said received data units is associated with a respective length, andwherein said flow control logic further includes logic fordetermining that said number of available transmissioncredits is sufficient... ...one of saidat least one of said received data units associated withsaid second flow control

mode, and said number ofavailable transmission credits is at least as great assaid...8, further comprising:associating at least one of said received data unitswith a first flow control mode;associating at least one of said received data unitswith a second flow control mode; anddetermining that said number of availabletransmission credits is sufficient to begin transmission... ...one of said at least one of said received data unitsassociated with said first flow control mode.

10 The method of claim 9, further comprising:

associating each of said received data... ...one of said at least one of said received data unitsassociated with said second flow control mode, and saidnumber of available transmission credits is at least asgreat as said... ...in saidqueues, a first subset of said received data unitsassociated with a first flow control mode, and a secondsubset of said received data units associated with asecond flow control mode;queue traversal logic for selecting a data unit fortransmission, wherein said selected data unit is one ofsaid subset of said received data units associated withsaid first flow control mode and stored at a head of oneof said queues, said. one of said... ...saidqueues having one of said subset of received data unitsassociated with said first flow control mode stored at itshead; anddequeuing logic for dequeuing said selected dataunit.

12... ...each of said received

data units is associated with a respective length, andwherein said flow control logic further includes logic fordetermining that said number of available transmissioncredits is sufficient... ...one ofsaid at least one of said received data units associatedwith said second flow control mode, and said number ofavailable transmission credits is at least as great assaid... ...of data units;associating a first subset of said received dataassociated with a first flow control mode;associating a second subset of said received dataunits associated with a second flow control mode;storing said plurality of received data units in aplurality of queues, each of... ...unit is one of said subset of said receiveddata units associated with said first flow control modeand stored at a head of one of said queues, said one ofsaid... ...said queues having one of saidsubset of received data units associated with said firstflow control mode stored at its head; anddequeuing said selected data unit.

14 The method of... ...one of said at least one of said received data

units associated with said second flow control mode, andsaid number of available transmission credits is at leastas great as said... ...units;means for associating a first subset of said receiveddata associated with a first flow control mode;means for associating a second subset of saidreceived data units associated with a second flow controlmode;means for storing said plurality of received dataunits in a plurality of queues... ...unit is one of said subset ofsaid received data units associated with said first flowcontrol mode and stored at a head of one of said queues,-4 5said one...said queues having one ofsaid subset of received data units associated with saidfirst flow control mode stored at its head; andmeans for dequeuing said selected data unit.

?